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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,009	02/20/2002	Mitsuru Uesugi	L9289.02118	4532

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EXAMINER	
AGHDAM, FRESHTEH N	
ART UNIT	**PAPER NUMBER**
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/069,009	UESUGI ET AL.	
	Examiner	Art Unit	
	Freshteh N. Aghdam	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *30-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *30-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/6/2007 has been entered.

Response to Arguments

Applicant's arguments with respect to newly presented claims 30-42 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 30-31, 33-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshida (US 6,452,964).

As to claim 30, Yoshida discloses an adaptive modulation receiving method/ apparatus comprising a receiver that receives a transmitted signal (Fig. 6); a plurality of demodulators that each demodulates the received signal (e.g. symbol) based on a different demodulation pattern corresponding to a bit of an idealized modulation constellation (Fig. 6, means 506-508, Col. 11, Lines 60-67; Col. 12, Lines 1-10); and a plurality of detectors each corresponding to a different demodulators and each performing error detection on demodulation information provided by the corresponding demodulator to determine whether a bit represented by the demodulation information was received correctly (means 503-505 and 509), wherein the bit represented by the demodulation information of each demodulator is the bit corresponding to the demodulation pattern applied by the demodulator (means 506-508), the modulation applied to the transmitted symbol is not a higher level of modulation than that applied as the idealized modulation (because the modulation applied to the transmitted symbol is one of the modulation that is applied as the idealized modulation), and regenerated information represented by the received symbol comprises the demodulation information produced by all of the demodulators (outputs of means 506-508 and 510-512).

As to claim 31, Yoshida discloses that each detector outputs the bit represented by the demodulation information of the corresponding demodulator as an effective bit if received correctly (means 503-505, 509, and 111; Col. 12, Lines 11-23).

As to claim 33, Yoshida discloses an adaptive modulation communication system comprising a transmission apparatus (Fig. 1A) and a receiving apparatus (Fig. 6) that communicate using a plurality of modulation levels, each modulation level corresponding to a constellation of symbols representing the set of distinct values that a particular number of data bits may express (Fig. 1B), wherein: the transmitting apparatus comprises a selector that selects one of the plurality of modulation levels to apply in a communication (Col. 3, Lines 17-24), a modulator that modulates a set of bits in accordance with the selected modulation level so as to generate a symbol corresponding to the modulation level (Fig. 1A, means 1004), and a transmitter that transmits the generated symbol to the receiving apparatus; the receiving apparatus comprises a receiver that receives a transmitted signal (Fig. 6); a plurality of demodulators that each demodulates the received signal (e.g. symbol) based on a different demodulation pattern corresponding to a bit of an idealized modulation constellation (Fig. 6, means 506-508, Col. 11, Lines 60-67; Col. 12, Lines 1-10); and a plurality of detectors each corresponding to a different demodulators and each performing error detection on demodulation information provided by the corresponding demodulator to determine whether a bit represented by the demodulation information was received correctly (means 503-505 and 509), wherein the bit represented by the demodulation information of each demodulator is the bit corresponding to the demodulation pattern applied by the demodulator (means 506-508), the modulation applied to the transmitted symbol is not a higher level of modulation than that applied as the idealized modulation (because the modulation applied to the transmitted symbol is

one of the modulation that is applied as the idealized modulation), and regenerated information represented by the received symbol comprises the demodulation information produced by all of the demodulators (outputs of means 506-508 and 510-512).

As to claim 34, Yoshida further discloses that the selector selects the modulation level using a number having an integer square root (Fig. 1B).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 32 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida, and further in view of Raleigh et al (US 2003/0072382).

As to claim 32, Yoshida discloses all the subject matter claimed in claim 30, except for a repeat requester that sends a repeat request to the transmitting apparatus that transmitted the symbol when one of the plurality of detectors detects an error. Raleigh discloses a receiving method/ apparatus comprising a repeat requester that sends a repeat request to the transmitting apparatus that transmitted the symbol when at least one of the plurality of detectors detects an error (Par. 77). Therefore, it would have been obvious to one of ordinary skill in the art to send a repeat request message

back to the transmitting apparatus when at least one of the plurality of detectors detects an error as taught by Raleigh in order to improve accuracy of data communications.

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida and Raleigh et al, further in view of the instant application's disclosed prior art.

As to claim 42, Yoshida and Raleigh teach all the subject matter claimed in claim 41, except for the selector selects the modulation level based on channel quality estimated from the repeat request signal. The instant application's disclosed prior art teaches that the selector selects the modulation level based on channel quality estimated from the repeat request signal (Fig. 1, means 1-2, 5-6, and 11; page 4, lines 18-page 5, line10).

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida, and further in view of Sugiyama et al (US 5,862,175).

As to claim 35, Yoshida discloses all the subject matter claimed in claim 33, except for the modulation level uses a number not having an integer square root. Sugiyama, in the same field of endeavor, teaches a communication system that the modulation scheme is varied among M-ary modulation schemes (n phase shift keying modulation schemes) each with a square root of the number of signal points not being an integer (Fig. 1, 2^n multi-level modulation means; Col. 3, lines 5-9). Therefore, it would have been obvious to one of ordinary skill in the art to perform selectable and

flexible modulation of variable order in a communication system as taught by Sugiyama in order to increase flexibility of the communication system.

Claims 36-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida, and further in view of Lee et al (US 6,259,744).

As to claim 36, Yoshida teaches all the subject matter claimed in claim 33, expect for the modulator modulates the transmission data by arranging signal points in such a way that a difference between the number of signal points on the I-axis and Q-axis is small. Lee, in the same field of endeavor, teaches a signal space diagram wherein the number of signal points on the I-axis is the same as the number of signal points on the Q-axis (e.g. the difference between the number of points on the I-axis and Q-axis directions is minimum; Fig. 3). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Lee with Yoshida in order to minimize bit error rate in the communication system by minimizing the difference between the number of points on the I-axis and Q-axis directions (Col. 2, Lines 17-19).

As to claims 37 and 38, Yoshida teaches all the subject matter claimed in claim 33, expect for using a modulation scheme in which a phase direction is identified by an axis that crosses an origin point in a signal space diagram. Lee, in the same field of endeavor, teaches using phase determination axes (Fig. 3, means 54 and 56; Col. 5, Lines 1-12 and 51-53) passing through the origin point in a signal space diagram and computing the closest distance between the symbol and the bit on the decision line (i.e. amplitude identification). Therefore, it would have been obvious to one of ordinary skill

in the art to combine the teaching of Lee with Yoshida in order to detect error probability of a bit in a symbol and improving the signal recovery process (Col. 5, Lines 7 and 8).

As to claim 39, Yoshida discloses that each detector outputs the bit represented by the demodulation information of the corresponding demodulator as an effective bit if received correctly (means 503-505, 509, and 111; Col. 12, Lines 11-23).

As to claim 40, Yoshida teach all the subject matter claimed in claim 33, except for the transmitter transmits a pilot signal (training sequence or the second bit decision line) arranged in the middle of a maximum amplitude in a signal space diagram of the modulation scheme. Lee teaches that the pilot signal (Fig. 3, decision lines 54 and 56) is arranged in the middle of a maximum amplitude in a signal space diagram of the modulation scheme (column 5, lines 1-10 and 30-32; column 6, lines 47-50). One of ordinary skill in the art would clearly recognize that transmitting pilot signal from a transmitter to a receiver is well known in the art and it is performed for performance characteristic measurements and synchronization purposes. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Lee with Yoshida in order to measure performance characteristics of a communication system and synchronizing the transmitter with the receiver by utilizing a pilot signal in the middle of the frame that is to be transmitted from a transmitter to a receiver.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Freshteh N. Aghdam whose telephone number is (571)

272-6037. The examiner can normally be reached on Monday through Friday 9:00-5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Freshteh Aghdam
Examiner
Art Unit 2611

March 28, 2007

KEVIN BURD
PRIMARY EXAMINER